



**National Institutes of Health  
Osteoporosis and Related  
Bone Diseases ~  
National Resource Center**

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# Osteoporosis: The Diagnosis

Osteoporosis is a condition of low bone density that can progress silently over a long period of time. If diagnosed early, the fractures associated with the disease can often be prevented. Unfortunately, osteoporosis frequently remains undiagnosed until a fracture occurs.

An examination to diagnose osteoporosis can involve several steps that predict your chances of future fracture, diagnose osteoporosis, or both. It might include:

- an initial physical exam
- various x rays that detect skeletal problems
- laboratory tests that reveal important information about the metabolic process of bone breakdown and formation
- a bone density test to detect low bone density.

Before performing any tests, your doctor will record information about your medical history and lifestyle and will ask questions related to:

- your risk factors, including information about any fractures you have had
- your family history of disease, including osteoporosis
- your medication history
- your general intake of calcium and vitamin D
- your exercise pattern
- for women, your menstrual history.

In addition, the doctor will note medical problems and medications you may be taking that can contribute to bone loss, including glucocorticoids such as cortisone. He or she also will check your height for changes and your posture to note any curvature of the spine from vertebral fractures, which is known as kyphosis.

## **Risk Factors for Osteoporosis and Fracture**

Several risk factors increase your chances of developing osteoporosis or having a fracture, including:

- a thin, small-boned frame
- previous fracture or family history of osteoporotic fracture
- estrogen deficiency, resulting from early menopause (before age 45), either naturally, from surgical removal of the ovaries, or as a result of prolonged amenorrhea (abnormal absence of menstruation) in younger women<sup>1</sup>
- advanced age
- a diet low in calcium
- Caucasian or Asian ancestry (African Americans and Hispanics are at lower but significant risk)
- cigarette smoking
- excessive use of alcohol
- prolonged use of certain medications.

## **X-Ray Tests**

If you have back pain, your doctor may order an x ray of your spine to determine whether you have had a fracture. An x ray also may be appropriate if you have experienced a loss of height or a change in posture. However, because an x ray can detect bone loss only after 30 percent of the skeleton has been depleted, the presence of osteoporosis may be missed.

## **Bone Mineral Density Tests**

A bone mineral density (BMD) test is the best way to determine your bone health. BMD tests can identify osteoporosis, determine your risk for fractures, and measure your response to osteoporosis treatment. The most widely recognized BMD test is called a dual-energy x-ray absorptiometry, or DXA test. The BMD test is painless, a bit like having an x ray, but with much less exposure to radiation. It measures bone density at your hip and spine.

During a BMD test, an extremely low energy source is passed over part or all of the body. A computer program evaluates the information and allows the doctor to see how much bone mass you have. Because bone mass serves as an approximate measure of bone strength, this information also helps the doctor to detect low bone

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<sup>1</sup> Women lose bone rapidly in the first 4 to 8 years following menopause, making them more susceptible to osteoporosis.

mass accurately, make a definitive diagnosis of osteoporosis, and determine your risk of future fractures.

BMD tests provide doctors with a measurement called a T-score, a number value that results from comparing your bone density to optimal bone density. When a T-score appears as a negative number (such as -1, -2 or -2.5), it indicates low bone mass. The greater the negative the number, the greater is the risk of fracture.

Although no bone density test is 100-percent accurate, this type of test is the single most important predictor of whether a person will have a fracture in the future.

## **Bone Scans**

For some people, the doctor may order a bone scan. A bone scan is different from the BMD test, although the term “bone scan” often is used incorrectly to describe a bone density test. A bone scan involves injecting the patient with a dye that allows a scanner to identify differences in the conditions of various areas of bone tissue. A bone scan can show the doctor changes in bone tissue that may indicate cancer, bone lesions, inflammation, or new fractures.

## **Lab Tests**

A number of lab tests may be performed on blood and urine samples. The results of these tests can help your doctor identify conditions that may be contributing to your bone loss.

The most common blood tests evaluate:

- blood calcium levels
- blood vitamin D levels
- thyroid function
- parathyroid hormone levels
- estradiol levels to measure estrogen (in women)
- follicle stimulating hormone (FSH) test to establish menopause status
- testosterone levels (in men)
- osteocalcin levels to measure bone formation.

The most common urine tests are:

- 24-hour urine collection to measure calcium metabolism
- tests to measure the rate at which a person is breaking down or resorbing bone.

## Treatment

In addition to diagnosing osteoporosis, results from BMD tests assist the doctor in deciding whether to begin a prevention or treatment program. Once you and your doctor have definitive information based on your history, physical examination, and diagnostic tests, a specific treatment program can be developed for you.

Recommendations for optimizing bone health include a comprehensive program that consists of a well-balanced diet rich in calcium and vitamin D, physical activity, and a healthy lifestyle (including not smoking, avoiding excessive alcohol use, and recognizing that some prescription medications and chronic diseases can cause bone loss). If you already have experienced a fracture, your doctor may refer you to a specialist in physical therapy or rehabilitation medicine to help you with daily activities, safe movement, and exercises to improve your strength and balance.

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### For Your Information

This fact sheet contains information about medications used to treat the health condition discussed here. When this fact sheet was printed, we included the most up-to-date (accurate) information available. Occasionally, new information on medication is released.

For updates and for any questions about any medications you are taking, please contact the U.S. Food and Drug Administration at 888-INFO-FDA (888-463-6332, a toll-free call) or visit its Web site at [www.fda.gov](http://www.fda.gov).

For updates and questions about statistics, please contact the Centers for Disease Control and Prevention's National Center for Health Statistics toll free at 800-232-4636 or visit its Web site at [www.cdc.gov/nchs](http://www.cdc.gov/nchs).

*Recognizing the National Bone and Joint Decade: 2002–2011*